Specific characters are distinct—the shaft is much more depressed than in the recent species—towards the distal expansion it is also twisted more strongly inwards, the inward direction of the median trochlea being more distinctly marked. This trochlea is moreover considerably narrower—the inner anconal edge of the shaft is not rounded off, but like the outer, forms a continuous linear ridge. The intertrochlear foramen is preceded by a very short portion of the groove-like depression of the shaft on its anconal aspect which in B. lobata is co-extensive with it. In the recent species there is on the side of the shaft immediately below the outer articular cavity an excavation of some size—of this pit no trace appears in the fossil.

The fossil is approximately two-thirds of the size of the metatarse of a male B. lobata. We do not, however, derive from this any precise idea of the relative size of the bird, since the sexes differ so widely in dimensions—if from a male it would represent a smaller, if from a female a larger species.

Locality—Chinchilla, Darling Downs.

Our attention is, by this fossil, once more called to the fact that the 'anomalies' among Australian vertebrates are but the more persistent portions of its archaic faunas.

ON FILARIÆ OF BIRDS;

By THOS. L. BANCROFT, M.B.

This investigation was undertaken with the hope that any knowledge gained therefrom might be of service in elucidating some of the problems of the life-history of Filariæ.

The Crow of Europe harbours a blood-parasite called Filaria attenuata. It was, therefore, of interest to ascertain if the crows of Australia harboured this or any similar parasite. It was easily and soon ascertained, for the blood of the first crow examined abounded

with embryo-filaria. To account for the propagation of the filaria of the crow was hopeless owing to the omnivorous diet of that bird; so a study of other birds was made, which led to the discovery of hæmatozoa in fourteen species, among which is the Blue-Mountain Parrot, an exclusively honey-eater.

This find of filaria in a parrot is fortunate for it has reduced the difficulties regarding the propagation of filariæ, of birds at any rate, to a minimum.

The Blue-Mountain Parrot harbours, as most birds do, a blood-sucking louse.

Helminthologists state that the life-cycle of a filaria requires two hosts.

The mosquito has been almost proved by Manson to be an intermediary host of Filaria hominis, and an Entomostracon "Cyclops" has apparently been shewn to transmit the Guinea-worm.

I believe I am justified in assuming the following:—

1st. The lice of birds are the intermediary hosts in the life-history of filariæ of birds.

2nd. Birds infect themselves by picking lice from an infected bird and afterwards re-infect themselves by picking their own lice; this would account for the immense numbers of hæmatozoa in some birds.

Of birds harbouring hæmatozoa, one-half are found infected.

As one would expect the older the individual and therefore the longer exposed to infection, the more is it likely to contain hæmatozoa. I killed a butcher-bird and its young one full feathered, the old bird's blood contained filaria, whilst the young one's did not. There are exceptions to this rule for occasionally very young birds are found infected, whilst old ones are free from hæmatozoa. With regard to the adult or parent worms, I had great difficulty in finding these and have succeeded in discovering only six specimens, viz., four mature females in butcher-birds (two in the peritoneum and two under the fascia of the muscles of the thigh), one

in the pericardium of a honey-eater called Annelobia lunulata, and one in the heart of a Soldier-bird, Myzantha garrula, these latter are males.

The measurements are as follows in fractions of an inch :—

Butcher-bird—4 females, nine-tenths by one-seventy-fifth.

Annelobia lunulata—1 male, half-an-inch by one one-hundred-and-twentieth.

Soldier-bird—1 male, three-fifths by one one-hundred-and-fiftieth.

I am unable to find a description of Filaria attenuata, so cannot compare my specimens with that worm, but am inclined to think that there are many different species of filaria in birds.

During manipulation mature female worms are very prone to uterine hernia. The uterus is entirely filled up with moving embryos in every stage of development.

In examining birds for embryo-filaria, it is best to cut out the heart and press it gently against a slide so as to leave thereon a little blood, put on a cover-glass and examine with a magnification of about one hundred diameters.

The blood in the heart contains worms often when they are not to be found elsewhere.

Immediately after the bird is shot is the proper time to examine the blood, and then it is often possible to see ten or even twenty worms in the field at once ; if the bird is left for six or more hours it is difficult to find them, and after thirty hours impossible. The worms soon die and are then quickly dissolved. Micrometer measurements of the embryos from different birds shewed them to be from 1/200″ to 1/80″ in length, and from 1/5000″ to 1/4000″ in breadth ; one would imagine that they were the same species in all birds, but it would be unwise to draw conclusions from the similarity of form of immature worms and an examination of the three different mature worms, I found, shew distinct specific differences. Whilst searching for the adult filariæ I obtained quite a number of other entozoa, consisting of various immature forms of

cestoda in the muscles and in the peritoneal cavity, mature tape worms, many species of lumbricus and some flukes of the gall-bladder, a rare field of research for a student of helminthology!

The following is the list of birds which harbour hæmatozoa, with the number of each examined and the number that contained filariæ.

Name.	Number examined.	Number that contained hæmatozoa.
Eurystomus pacificus—Roller-bird	9	9
Strepera graculina	1	1
Gymnorrhina tibicen—Magpie	4	3
Cracticus torquatus—Butcher-bird ...	23	12
Chibia bracteata	4	1
Myiagra plumbea	4	2
Sericulus melinus—Regent-bird	10	3
Mimeta viridis	5	2
Corvus australis—Crow	2	2
Pomatostomus temporalis	14	5
Myzantha garrula—Soldier-bird	16	15
Entomyza cyanotis—Blue-faced honey-eater	10	4
Annelobia lunulata	4	3
Trichoglossus novæ-hollandiæ—Blue-Mountain Parrot	6	3

In conclusion I have to thank Mr. Henry Tryon for his kindness in assisting me with a few birds and for the scientific names of the above-mentioned birds.

Brisbane,
January 28th. 1889.

Since the above was written I have examined a large number of birds, whose blood harboured embryo-filaria, for the adult worms and have succeeded in finding them in three specimens. Twenty-seven worms in the peritoneal cavity of a crow (fifteen females and twelve males), seven females and five males in the peritoneal cavity of a butcher-bird, and one male in a soldier-bird, this also was situated in the peritoneal cavity.

The measurements are as follows :—

Crow—Females, eight-tenths to an-inch in length by one-seventy-fifth in breadth.

,, Males, four-tenths by one one-hundred-and-fiftieth.

Butcher-bird—Females, seven-tenths by one-seventy-fifth.

,, Males, three-tenths by one one-hundred-and-fiftieth.

Soldier-bird—Male, three-tenths by one one-hundred-and-eightieth.

Podargus strigoides harbours hæmatozoa, two were examined and the blood of both abounded with embryo-filaria.

In the areolar tissue beneath the skin and under the fascia of muscles of some soldier-birds and the two specimens of Podargus examined, there were peculiar encysted nematoid worms much resembling Trichina spiralis but larger. If the adult filariæ of birds are placed in water, spirit of wine or chloroform, they at once rupture themselves, but, if put into Müller's fluid they die without rupturing.

March 10th, 1889.

ANATOMICAL NOTES ON THE HELICIDÆ;

By C. HEDLEY.

Thersites richmondiana *P. fr.*—The jaw of this species is strongly arcuate ; ends slightly attenuated, blunt ; crossed by about 11 flat ribs, broader than their interstices, denticulating the anterior but not the posterior margin ; the centre rib not projecting as a denticule but abutting on a sinus. In some specimens the ribs exhibit a tendency to divide into smaller riblets. The jaw, if extracted from the animal, contracts at once into a horse-shoe shape.

Of the radula, the rachidian tooth consists of a broad ovate single cusp, which sometimes does, and sometimes does not, project over the posterior edge of the basal plate. This type is repeated in the first dozen laterals, after which the point of the cusp becomes rounded, and denticules appear which gradually increase till an irregular trifid cusp is offered by the extreme marginals.